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Article (Published Version)

www.water-alternatives.org Volume 12 | Issue 1

Mdee, A. and Harrison, E. 2019. Critical governance problems for farmer-led irrigation: Isomorphic mimicry and capability traps. Water Alternatives 12(1): 30-45

Critical Governance Problems for Farmer-Led Irrigation: Isomorphic Mimicry and Capability Traps

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ABSTRACT: Irrigated agricultural production is viewed as key to the twin challenges of transforming agriculture and adapting to climate change in sub-Saharan Africa. Farmer-led irrigation is currently not well recognised or accounted for, and the current focus on state or public-private irrigation schemes means this activity is largely occurring outside of formal governance mechanisms or is deemed illegal. How do current institutional and regulatory frameworks relate to the apparent boom in farmer-led irrigation, and how do these shape current patterns of response, support, and regulation? To answer this question, we build a conceptual understanding of water governance which draws on critiques of current institutional frameworks for water and irrigation management, specifically using the conceptual ideas of isomorphic mimicry and capability traps, and elements of a problem-driven iterative adaptation (PDIA) approach. We then use three case studies from Tanzania and Malawi to illuminate three critical problems that state institutions encounter in approaching the recognition and regulation of farmer-led irrigation. In our conclusion we argue that current irrigation governance is creating capability traps for existing institutions. Where incremental and context-driven adaptation of governance is practised this can be avoided, creating better chances of effective support and regulation of farmer-led irrigation development.

KEYWORDS: Farmer-led irrigation development, innovation, governance, Tanzania, Malawi

INTRODUCTION

A renewed push to transform agriculture and to mitigate the impacts of climate change has led to a frenzy of claims relating to the power of irrigation as a critical component of transformation (Conceição et al., 2016; Hallegatte et al., 2015). Recent work on farmer-led irrigation in sub-Saharan Africa suggests that areas of irrigated agriculture are far larger than official assessments have suggested (Beekman et al., 2014; de Fraiture and Giordano, 2014; Woodhouse et al., 2017). Such irrigation is the result of the individual and collective efforts of farmers rather than a project of the state, development partners, or large-scale private investment. But these farmers and their innovation and expansion in irrigation practice are often 'invisible' or illegal in official policy spaces and legislation (Mdee, 2017, de Bont et al., 2019). There is growing evidence that this irrigation can be profitable for the small-scale[1] farmer, but some argue that it has potentially problematic implications for environmental degradation and equity as it is unregulated (de Fraiture and Giordano, 2014).

[1] Defining a 'small-scale' farmer is notoriously problematic. What is interesting about the growth of farmer-led irrigation is that it is being driven by private actors operating at relatively small scales and without complex collective organisation (see Harrison and Mdee, 2017a for a specific analysis of scale in irrigation).

What then are the critical challenges for current institutional and regulatory frameworks in recognising, regulating, and enabling farmer-led irrigation? This question can be explored both theoretically and empirically. From a theoretical perspective we draw on the concepts of isomorphic mimicry and capability traps, and the problem-driven iterative adaptation (PDIA) approach (Andrews et al., 2013, 2017) to identify potentially critical 'problems' for governance and institutional arrangements in the context of the rise of farmer-led irrigation. A 'problem' in this sense refers to a puzzle to be addressed rather than necessarily indicating a negative connotation. These problems are not assumed to be universal and may be subject to considerable contestation by different actors. A PDIA approach assumes that defining such problems is the first step for governance organisations to take in working out how to take action. Problems are also not fixed in any way, their formulation shifts over time and space, and requires review and revision. In this sense they are a device around which practical actions can be formulated at a specific point in time.

We use empirical case study data from Malawi and Tanzania to illustrate three potential challenges for irrigation governance that appear to arise from increasing farmer-led irrigation: boundaries and definitions of 'illegality' and the form of state-sanctioned collectivities for irrigation; increasing competition over water and land resources relating to increasing irrigation; and, lastly, increasing differentiation between farmers.

The article first critiques current mainstream assumptions in water governance, through drawing on broader arguments on the wider discourse and practice of 'good governance'. We apply the concept of 'capability traps' to current irrigation and water management institutions to illustrate the divergence between policies and institutions in theory and how they actually function in practice. Further, we use the concept of 'isomorphic mimicry' as detailed by Andrews et al. (2013, 2017), to show that institutions and governance frameworks that are designed based on externally derived 'best practice' principles, often embedded in the tenets of Integrated Water Resources Management (IWRM), are in practice dysfunctional, facing chronic capacity issues and unable to respond to, or even recognise, actual irrigation patterns. We then explain how a PDIA approach offers a way of navigating beyond these capability traps, through starting from contextualised understandings of current practice, framed as a 'problem' to be solved collaboratively by local state and non-state actors. 'Local actors' in this context refers primarily to institutions and actors within a specific state, as opposed to external actors.

In developing this argument, we are also conscious of how the politics of scarcity, and the wider political economy of agricultural transformation, shape institutional and regulatory narratives. Decisions over who are legitimate users of natural resources entail normative judgements concerning the kinds of practices that characterise some farmers as desirable (to be encouraged) and some as undesirable (to be discouraged). Successful and thriving farmer-led irrigation development appears to disrupt a strong narrative that sees the 'traditional' small-scale farmer as resistant to change and trapped in a low-return agricultural mode (Woodhouse et al., 2017; de Bont et al., 2019; Harrison and Mdee, 2018).

CAPABILITY TRAPS AND ISOMORPHIC MIMICRY IN WATER GOVERNANCE

Approaches to state building and development, funded and implemented by international institutions and official development assistance, have been dominated by ideas and practices of 'good governance' since the 1990s (Grindle, 2004, 2007, 2017). Such approaches are built on idealised sets of principles and best practices that are viewed as critical components of creating institutions that enable states to deliver development (Brinkerhoff and Brinkerhoff, 2015). Aid-dependent countries have accordingly produced a range of 'good' institutions with the 'right' types of policy and institutional architecture in place, in response to the incentives of aid conditioned to produce this effect.

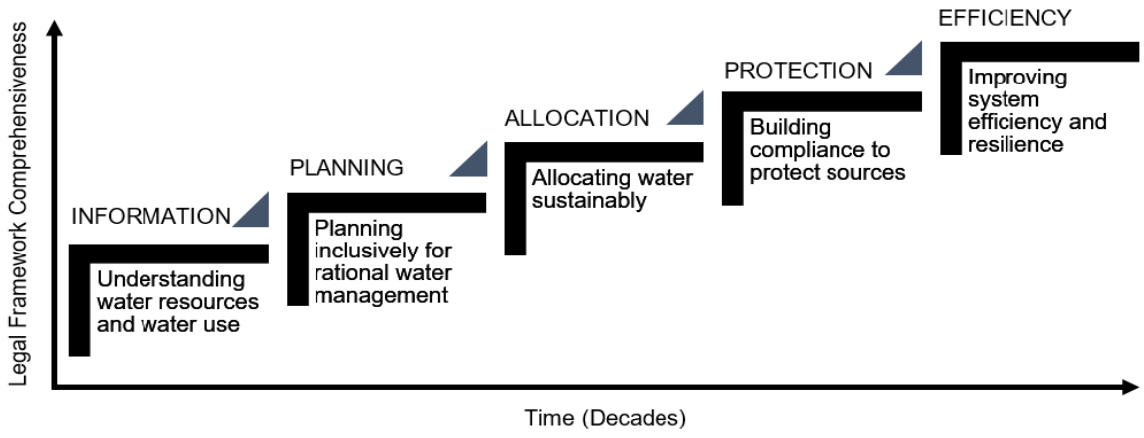
Yet many of these policies are not implemented in practice, and many institutions do not function as they are designed to (Mosse, 2004; Lange 2008). A growing critique of good governance models argues

that assumptions of causality which suggest that good governance drives development were erroneous, and that evidence suggests that the attempt to transplant 'best practices' from one context to another, has actually weakened states (Tendler, 1997; Li, 2007; Booth, 2011; Andrews, 2013; Levy, 2014; Wild et al., 2015; Andrews et al., 2017). Andrews et al. (2017) argue that states become stuck in capability traps where they cannot perform what is expected of them or what they promised to do in the policy frameworks that they designed in response to international pressures. They may have policies that are classified as good but lack the capability to implement them. 'Isomorphic mimicry' is a concept that draws attention to how institutions, policies, and legislation mimic the shape and appearance of best practice, but do not have the requisite underlying functionality (DiMaggio and Powell, 1983; Andrews et al., 2017; Swidler and Watkins, 2017). This can result in unclear lines of accountability, and opportunities for political patronage and rent seeking, with the more powerful able to bypass regulations that may be enforced on others (Andrews, 2013; Andrews et al., 2017; Mdee et al., 2017; Wild et al., 2015).

Isomorphic mimicry is evident in the legal frameworks deployed to regulate water use, where externally driven audit and indexing exercises encourage states to create complex frameworks even where they have limited capacity to implement them. For example, an audit of legal frameworks on water for the World Bank, Enabling the Business of Agriculture (EBA) (Garthwaite et al., 2017), uses an audit tool to assess the comprehensiveness of water legislation in relation to agriculture based on the categories set out in Figure 1 (below). The limitation of such an exercise is that all it shows is whether the country possesses a law, it does not assess the degree of implementation of that law. This is exactly the type of audit process that Andrews et al. (2013) warn against. The authors of the World Bank study also warn against the adoption of complex institutional mechanisms, suggesting that a country cannot progress along the stages of legal comprehensiveness until basic components for implementation are in place and are functioning:

> Similarly, at the most complex end of the chain, features of highly-developed systems (e.g. resource pricing and formal water markets) are largely irrelevant without a strong foundation starting with water information systems, planning, allocation, and protection through strong compliance. This model recognizes that the development of a strong and context-appropriate system for water management is a long process even under the best conditions. As has been well-stated, "[t]here is no shortcut for a poor society to morph its informal water economy into a formal one" (Shah and van Koppen, 2016). (Garthwaite et al., 2017: x)

Figure 1. Example model for cross-learning on law for water and agriculture.



Source: Garthwaite et al. (2017).

Many countries have comprehensive laws on paper but lack the capacity and capability to fulfil the first building block of the framework – that is "understanding water resources and water use" – and hence lack the capability to understand fundamental patterns of water use. Without this, Garthwaite et al. (2017) argue that there is little point in creating laws and institutions relating to planning, allocation, protection, and efficiency.

Integrated water resources management remains the dominant best practice form of water governance and is prescribed in SDG 6.5: "By 2030 implement Integrated Water Resources Management at all levels". IWRM offers a classic case of a good governance problem. In this article we do not offer a critique of IWRM itself (see Boelens and Vos, 2012; Molle, 2008; and Mdee, 2017). Here we use it as the proxy of best practice formulation in the water sector. Being a framework favoured by donors, many countries have reconfigured their policies around IWRM tenets of river basin level management, participatory demand-led management, and a reduction in strategic planning at the state level. However, this has led to a problem of isomorphic mimicry whereby policies and institutions are created to give the appearance of reform, but in practice lack critical operational capability to implement the policies as designed. The issue here is not the gap itself, but the assumption that universal best practices[2] can be applied in divergent socio-political settings. The extent to which isomorphic mimicry might be observed also depends on the nature of the state and its capacity to formulate policy. Countries with high levels of aid dependency are under greater pressure to conform to ideas of best practice. Formulating policies that reflect assumed best practice is part of a game designed to try to attract resources (Crewe and Harrison, 1998; Ferguson, 2006; Poku and Mdee, 2011).

Within the logic of IWRM, the water users' association (WUA) has become the recommended collective form for solving the competing interests of water users. In practice, organisations labelled as WUAs have taken on different forms and meanings according to the socio-political context of their application (Kemerink et al., 2013; Veldwisch and Mollinga, 2013; Förster et al., 2017). However, national policy adoption of WUAs can lead to the imposition of bureaucratic and state-sanctioned forms of organisation with high transactional costs for members, and the potential to create isomorphic mimicry. Evidence for Tanzania and Malawi suggests that WUAs can, in contrast to their stated aims, be exclusionary and elite-dominated, absorb limited resources, cause conflicts (between competing WUAs), and undermine other cooperative arrangements (Cleaver and Toner, 2006; Mulwafu, 2010; Muller, 2015; Mdee, 2017; de Bont, 2018). More broadly, they frequently do not possess the mechanisms required to adjudicate and negotiate competing water use especially in the context of powerful external interests, for example in situations of external large-scale investment (Scoones et al., 2018). Water users outside of these formal mechanisms become either invisible or illegal and may be marginalised using degradation narratives (Batterbury et al., 1997; Mehta, 2014; Mdee, 2017). In Tanzania in particular, there is a growing body of evidence demonstrating the gap between policies and institutions for water governance, and their capability in practice (see, for example, Harrison and Mdee, 2017a, 2017b; van Eeden et al., 2016).

There are therefore considerable challenges for existing approaches to water and irrigation governance in addressing the tensions that are already emanating from instances of farmer-led irrigation. According to Andrews et al. (2013, 2017), capability traps are created through a tendency to mimic ideal institutional forms or policies, without consideration of the complexities of the local context and the resource capacity for implementation. Hence these authors argue against ambitious policy statements and institutional design, and for creating an embedded and context-specific process of institutional learning and experimentation which responds to the actual existing patterns of practice and interaction.

[2] There is no one set of best practices – they are also contested to some degree. At times there may be more conformity around one set of ideas, and streams of funding that encourage its adoption.

UNDERSTANDING FARMER-LED IRRIGATION (FLID) IN THE CONTEXT OF AGRICULTURAL TRANSFORMATION NARRATIVES

In order to analyse the water and irrigation governance challenges presented by FLID, it is necessary to contextualise it in relation to the conjuncture of macro-economic, temporal, spatial, and political forces that shape both structural change, and individual and collective agency in agriculture (Li, 2014). Patterns of agriculture are changing in sub-Saharan Africa with increasing differentiation of agricultural practices and presenting this in terms of a binary discourse of tradition versus modern obscures the complex and specific local patterns of differentiation (Andersson Djurfeldt and Hillbom, 2016; Sitko and Jayne, 2014; Scoones et al., 2018; Neves and Du Toit, 2013). However, legislation and institutional frameworks in sub-Saharan Africa tend to be based on such binaries, and this is reflected in policy and discourse on agricultural transformation.

Evidence suggests that differentiation is leading to emerging patterns of dispossession and redistribution of land and water resources away from the poorer to the wealthier. In relation to land, this can be fuelled by individual titling, and large-scale land investments (Stein et al., 2016; Maganga et al., 2016; Dell'Angelo et al., 2017). The same tensions are evident in access to water for irrigation, with preferential formal access given to large-scale investors. However, this differentiation is also happening within agricultural communities, and is not only about the large-scale commercially driven dispossession of water and land (Sitko and Jayne, 2014).

Dominant narratives of agricultural transformation continue to promote an assumed structural-economic transformation that will propel a shift from small-scale peasant agriculture to large-scale commercial production for export markets. This assumption persists even while agricultural production remains dominated by small-scale producers, and is a consistent thread in the evolution of policy and practice in much of sub-Saharan Africa (Birner and Resnick, 2010). This narrative of transformation also doggedly persists in the policy documents of governments in which sub-Saharan African irrigation is ascribed a critical role in driving transformation; at the same time, however, it is argued that sub-Saharan Africa's progress on realising its irrigation potential is slow (Harrison and Mdee, 2018). Irrigation is now further seen as central to initiatives to increase resilience to the impacts of climate change, through 'climate-smart agriculture' (CSA) (Hallegatte et al., 2015).

While the agricultural modernisation narrative remains consistent, policy frameworks and investment strategies tend to reflect the time in which they were drawn up. In the colonial and immediate post-colonial era, state-led investment models dominated. As the state withdrew during structural adjustment and the neo-liberal turn, state investment was withdrawn, and the wider agricultural sector struggled under the removal of subsidies. Government irrigation schemes were transferred to 'the people' under the emancipatory aim of putting them in control through demand-led initiatives and in line with narratives of participation and empowerment. More recently, as the economies of sub-Saharan Africa rebounded under a commodity boom, attention has turned to the role of the private investor in driving irrigated and commercialised agricultural production, through public-private partnerships (de Bont, 2018; Harrison and Mdee, 2018).

Small-scale farmers tend to be dismissed in the agricultural modernisation discourse as 'traditional' and uneducated, and in need of knowledge and inputs to improve their production. Policies determine that they require formal and legally sanctioned organisation and management in order to commercialise (de Bont, 2018; Mdee, 2017). For example, Tanzania's 2013 irrigation policy asserts the aim that all 'traditional' irrigation is to be improved, with the small-scale farmer being equated with this label. However, while official irrigation expansion increases slowly and with dependence on donor-funded inputs (see Harrison and Mdee, 2017b), it appears that small-scale farmers are driving a more rapid expansion in irrigated production than previously assumed (Woodhouse et al., 2017). They do not fit the story told by the dominant policy and institutional narratives.

The recent rapid development of farmer-led irrigation appears to be underpinned by innovation in irrigation methods by some farmers through better access to technology such as hosepipes and small pumps, and improvements in local food markets driven by economic growth, population increase, and urbanisation (ibid). These activities may occur outside of formal frameworks of irrigation and water governance. Existing formal water management institutions (such as River Basin Offices which issue permits) potentially discriminate against farmer-led innovations in irrigation if they don't fit into dominant categories/assumptions in relation to irrigation practice, or when they take forms that are invisible to the state. For example, permits may be issued based on certain forms of association or organisation by small-scale farmers, so farmers operating as individuals or those with informal (unofficial) organisations/collectivities find it problematic to gain permits for their water use, and therefore operate 'illegally' from the perspective of the state.

Increasing FLID is also being driven by broader political economy considerations, such as the multiple and diverse engagements in sub-Saharan African agriculture that reflect Chinese interests (Amanor and Chichava, 2016; Gu et al., 2016; Scoones et al., 2016). These authors note that Chinese impacts on agriculture in sub-Saharan Africa are not the result of a unified state-led project, but rather are a diverse mix of state and individual investments and opportunities. In practical terms, it is significant that through this pattern of Chinese-African (and also Indian-African) agricultural linkages, irrigation technologies such as pumps and hosepipes are available at affordable prices to those with capital to invest, and this has contributed to increasing innovation and expansion in irrigation patterns and practice. Patterns of innovation, technology adoption, and expansion are shaped by a wide range of social, economic, and political factors. Governance and control often lag behind adoption of technology and innovation in practice (Genus and Stirling, 2018; Pansera and Owen, 2018). Economic and social factors thus influence the availability of technology, but it is also vital to understand the sociopolitical contexts which shape attempts to control irrigation adoption and practice (Wanvoeke et al., 2015; Venot, 2016). Authoritarian environments may use compulsion for the adoption of prescribed technologies of which the state approves, such as in Rwanda where agricultural choices (e.g. what crop to plant where) and local governance are strictly controlled (Dawson et al., 2016; Purdeková, 2011), but this requires a state with the capacity and capability of doing so.

This illustrates that specific contextual relations and conditions shape the way that FLID evolves. Irrigation policy and institutions are unlikely to be able to ever fully regulate and control the shape and nature of farmer-led irrigation practices. Therefore, how a state is able to respond to the challenges that it creates will be shaped by the capacity and capability of existing institutions, but also in relation to political and economic narratives of development and resource use. Trying to design best practice or good governance institutions to deal with FLID is unlikely to succeed if they are based on a set of flawed assumptions about the shape and dynamics of the practice. In order to avoid isomorphic mimicry and the creation of capability traps, it is necessary that the policy and institutional responses to FLID start from an understanding of it that is informed by analysis of the context of the wider macro forces, the differentiated and independent nature of its spread, and the expressed challenges of actors involved in it, affected by it, or who are seeking to regulate it.

CASE STUDIES OF FARMER-LED IRRIGATION IN TANZANIA AND MALAWI

We use three case studies in this paper as a means of exploring institutional and governance challenges that are highlighted by increasing FLID. Two of the case studies (Choma in Tanzania, and Chitsukwa in Malawi) are drawn from an DFID-ESRC funded project exploring the politics of irrigation in Malawi and Tanzania, and are based on primarily qualitative ethnographic exploration (2013/14) of irrigation organisation and practice. (A more detailed overview of methodology can be found in Chiroro, 2015; Mdee et al., 2014; Harrison and Mdee, 2017a, 2017b; Mdee, 2017; Harrison and Chiroro, 2017.) A third case study (Miwaleni Springs, Tanzania) is drawn from longitudinal work by Mdee, with ethnographic

engagement, from 1996 to 2018 (see Toner, 2008; Cleaver and Toner, 2006; Mdee, 2008), and draws on the work of de Bont (2018). The case studies use ethnographically based methods which fit the requirement of revealing particular problems arising in particular contexts as expressed by interested actors. We highlight three governance challenges for FLID, using one illustrative case study for each: the boundaries of legality and illegality for small-scale irrigators, increasing competition for water and land, and increasing differentiation between farmers.

'Illegal' or non-state-supported modes of organisation and innovation: Choma, Tanzania

Choma is part of the urban area of Morogoro but sits above the town in the Uluguru Mountains. In the relative cool of the mountains, the long-term residents (the *WaLuguru*) have abandoned canal irrigation in favour of hosepipes and sprinklers fed through mountain rivers. This practice spread quickly from farmer to farmer over the course of about ten years, through the close social relations of the Waluguru. Hosepipes and sprinklers imported from China were increasingly on sale in Morogoro at a cost affordable to the farmers. Using the hosepipes reduces the work required in digging and maintaining canals and allows more of the steep slopes to be irrigated. One farmer reported: "The government told us that our traditional irrigation canals were wasteful and inefficient. Now that we are able to use hosepipes, we have rarely use canals if we can avoid it". Far from being 'trapped in decline' (see van Donge, 1992), the farmers are improving their livelihoods through high-value vegetable and fruit production. Land access is relatively secure through kin networks, but plots are small, fragmented, and on steep slopes, and access to water is contested (Harrison and Mdee, 2017b). From the perspective of the Morogoro Municipality, the Luguru farmers are illegal water users, as they do not have water permits from the Wami-Ruvu River Basin Office, the legally designated custodian of water resources. In 2006/7, there was an attempt to evict them from the mountain on the basis that they were causing environmental degradation and water shortages downstream in Morogoro. The Wami-Ruvu River Basin Office does not have the technical capacity to measure water flows in the river at the upper levels, and so it is difficult to ascertain the level of extraction by the farmers. What is clear is that the Morogoro Urban Water and Sanitation Authority (MORUWASA) does not currently have sufficient water resources to meet urban demand throughout the year. They argue that the farmers' water use is impacting on water availability for the urban area, and therefore the Morogoro Municipal Council is under pressure to move the farmers from the water catchment. This eviction attempt was thwarted by intervention from the President, Jakaya Kikwete, but the institutional tension has persisted. After the 2006/7 eviction attempt, the farmers were told they could stay on the mountain if they farmed in environmentally beneficial ways. Existing by-laws were enforced to prevent farming within 60 metres of the water course, and in 2016 some houses in the valley bottoms were demolished on the orders of the Municipal Council. In 2017, the military used force to cut the water pipes. This was despite of the adoption of agro-ecological practices by farmers, such as use of organic pesticides, terracing, and composting to prevent pollution and excessive run-off (Mdee et al., 2018).

The case of the Choma farmers illustrates a tension between the socially embedded and highly adaptive production system of the farmers and the more formal regulatory structures of the Tanzanian state (Mdee et al., 2018). The farmers in Choma actively resist incorporation by the state. They do not want to formalise to form a water users' association which would require them to pay fees for water access, given that they regard their own management of the water resources to be equitable and consensual. Mdee was told that the Wami-Ruvu River Basin Office would be willing to issue a permit for the multiple small hosepipe water intakes, but the farmers are suspicious. Many regard the local government as having done little to support them, and rather as simply wanting to either tax them or seize their land (Mdee et al., 2014). With a view typical of most mountain residents, one farmer commented: "[W]hat does the government do for us? We have always been here, we work together to solve any issues".

The Choma farmers organise themselves in a way that the state regards as problematic, and 'traditional'. The Tanzanian irrigation policy suggests that 'traditional' irrigation requires improvement through external intervention, and organisation in a proper recognised form (Mdee, 2017; de Bont, 2018). Yet the Choma farmers demonstrate innovation and agricultural transformation without external intervention. Critical to their case was the new availability of technology (hosepipes and sprinklers), and strong and enduring local institutions for managing water and land access. The Choma farmers also illustrate the problematic nature and persistence of degradation narratives that shape political responses to competition for resources. It is important to note that blaming the inhabitants of the Uluguru Mountains for environmental degradation has been a consistent theme since German occupation (see Mdee et al., 2018 for more details). It is easy to blame the farmers for water shortages in Morogoro: they are relatively powerless. Yet there is no wider reflection on existing patterns of water use (the river basin office does not have the capacity to measure this), and there appears to be no political acknowledgement of the tensions in competing water use. For example, the Wami-Ruvu River Basin Office suggests that the heavier water users in the area were two large universities and the Mzinga army base (which is involved in irrigation), and yet they had limited power to address this. The farmers on the mountains are thus an easy target compared to other more powerful water users.

In this case, the director of the Wami-Ruvu River Basin Office clearly articulated their capability trap, expressing her frustration at lacking the staff and resources to implement the official policy of organising all water users into associations. Official policy and best practice guidelines showed isomorphic mimicry in their requirement for small-scale farmers' access to water to be legitimised through the establishment of an officially recognised water users' association. The Office had insufficient resource capacity to support this process across the Uluguru Mountains, and the director doubted that the cost of doing so was warranted in relation to the income (through payment for permits) that this would generate. They were limited to selling water permits to those who sought them and were thus caught in a capability trap, working with policy directives built on mimicking best practices but without capacity for implementation, and with a limited mandate to address the existing irrigation practices. In practice, a pragmatic and political negotiation occurs involving a range of local actors, but this happens outside of official policy frameworks and governance arrangements.

Tensions over land, water and technology in Southern Malawi

Nsanje District in Southern Malawi has some of the worst indicators of poverty in the country and is frequently beset by both floods and droughts (Chiroro, 2015). Agricultural productivity has been seen as stubbornly low and, as a result, there has been a range of government and NGO/donor-supported interventions to improve productivity. These initiatives include several in support of irrigation which are in line with the Malawi Growth and Development Strategy (MGDS). Chitsukwa is one such irrigation scheme, located within Group Village Headman (GVH) Mchacha James and supports farmers from over 15 villages, including those located as far afield as 10 to 15 km from the irrigation scheme. What started as a small government-initiated scheme in 2001 has expanded rapidly in recent years, and this expansion has brought with it significant tensions between those who keep livestock and those who irrigate.

The initiative to establish a maize irrigation scheme was first discussed in 2001 by a small group of farmers and the local extension officer. The following year, three canals were constructed with funding sourced by the district from the Highly Indebted Poor Countries (HIPC) programme. Forty-five farmers signed up to be part of the original scheme and were each issued with treadle pumps on loan from the government, however the farmers found the treadle pumps too difficult to use and too labour intensive, and many returned them to the government office. In 2005 the scheme began to expand rapidly such that by 2013 it was supporting 2645 farmers and covered 280 hectares. This expansion was prompted by NGO support in the form of both the construction of additional canals, and the supply of fertilisers, sprayers, and seeds. Also significant in the expansion was the technological innovation of the

farmers: irrigators had devised a way to reduce the work of using the treadle pump by removing some rubbers from the cylinders.

The construction of Chitsukwa was on land that had a history of livestock grazing intermixed with cropping. There was disagreement, however, over what the land had originally been used for, and this disagreement was largely fuelled by the expansion of irrigation farming. One group, comprised mostly of households with livestock, claimed that the land had always been a grazing area and was then converted into cropland. As one put it: "God created this area, so our animals could graze". In contrast, the irrigators maintained the view that the land had always been used for crop production but had been abandoned following successive seasons of flooding, and during those episodes had been left for livestock grazing but was now being converted back to cropping. The introduction of the treadle pump was seen as having prompted the reclamation of this farmland from grazing.

Conflict and tensions exist in a context of increased government and NGO emphasis on support for cropping and irrigation, as opposed to livestock and fishing which are often presented as destructive. This emphasis takes the form of practical support and funds, as well as through formal organisation, for example in government and NGO support to the irrigation scheme, including the creation of a formal representative body for the irrigators. Thus, government extension officers argue that farmers need to destock, but livestock farmers see their animals as both important capital assets and status symbols, and therefore reject such approaches.

In this case, the issues at play in the conflict were primarily over grazing land and drinking water for livestock. The continued expansion of the scheme was reducing the grazing area available to animals. One disgruntled livestock owner complained that as a result of the expansion of the scheme, their animals were travelling further to get food and as a result productivity was falling. He also pointed out that tensions between irrigators and livestock farmers were undermining other livelihood activities: "These people [in reference to irrigators] are difficult to understand. Why can't they just allow animals to graze and leave manure? Their problem is that they have been trained to believe that manure comes from rotting maize residues". Livestock keepers believed that irrigation was contributing to the reduced availability of crop residues because some farmers were retaining their maize stalks for mulch in support of irrigation and conservation farming. Livestock were also taking advantage of the canal water to drink, but in the process were creating siltation in the canals. Irrigators had responded to this by maiming any animals spotted in the scheme during the cropping season, and there were several cases of animal poisoning and injuries inflicted using *pangas* (knives). Several plots were observed where irrigators had actually preferred to burn crop residues rather than let livestock feed on them. The argument made by the irrigators was that grazing livestock would damage their investment in ridge-making. Possibly in response to these events, livestock keepers began to refuse access to manure for irrigating households, forcing them to rely on inorganic fertiliser which was both expensive and seldom available.

The livestock farmers also believed that even though they had not received support from the government, there was strong resentment and jealousy of livestock farmers by irrigators.

> People are jealous at those of us with livestock, and when they get the chance, they will stone our livestock. For most of them, even if they combined fishing and selling maize, they still wouldn't afford to buy a cow. They have other things they aspire for, like radios, clothes, and the like. Their frustration is turned into jealousy (Livestock Farmer, Chitsukwa).

This jealousy was related to the fact that, even compared to success as an irrigator, owning livestock is still seen as the 'ultimate achievement'. Most of the irrigators were still unable to raise enough capital to purchase livestock – even a calf, which costs an equivalent of 15 bags of maize. The livestock keepers argued that the injury meted on their livestock by irrigators was the result of frustration at being 'stagnant' as farmers.

The situation in Chitsukwa illustrates a clear case of competing interests, in this case between different livelihood strategies. Such competition, however, cannot be resolved or adjudicated within existing institutional formations such as WUAs or representative organisations, as by their nature these often show a biased support of the interests of represented groups. The institutional challenge for governance organisations is therefore one of how to adjudicate competing water use in such a way as to guarantee a fair consideration of more marginal groups. In this case, marginality – whether of livestock farmers or irrigators – is itself contested and building institutions that take this into account requires consideration of diverse voices. This means attending to function (what is done and by whom) as much as to form (how institutions are formally designed). In the case of Chitsukwa, organisational forms are not especially well developed: the irrigators are organised so far as their project is concerned, but livestock keepers are outside of these structures. The NGO project design used isomorphic mimicry in the creation of formal organisational structures within the boundaries of their project, but this exacerbated a wider capability gap for local institutions in addressing competing demands over resources.

Increasing differentiation between farmers: Uchira, Tanzania

This case is built on insights from ethnographic work in Uchira by Mdee (1996, 2004-2010, 2014-2016). Uchira is a lowland settlement on the highway, 20 km from Moshi town in Tanzania. It was established in the 1950s by Pare and Chagga settlers from the overcrowded uplands. Once thriving as a livestock trading centre, an anthrax outbreak and major drought impacted the local economy in 2004. Since then agriculture has stagnated, and the majority depend on other sources of income (most notably breaking up rocks and cutting bricks), supplemented by significant remittances from urban-based family members. The seasonal river barely flows even in the rainy season. Six kilometres from the centre of the village a major fresh water spring rises from the ground, and the land bordering the spring as well as the Miwaleni settlement are under the jurisdiction of the village council in Uchira. (In 2016 the village was split into two, and since then the new village of Koresa covers the spring.) A long established WUA is already present in Uchira – but it is only concerned with drinking water supply (see Mdee, 2008; Cleaver and Toner, 2006). Funded by the German Technical Cooperation Agency (Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ)) in 2002, the Uchira Water Users' Association (UWUA) oversaw the rehabilitation and extension of the gravity-fed water service. Water tariffs and metering were introduced. One significant aspect of this initiative, for this paper, is that UWUA became engaged in a series of difficult negotiations over external water sources in order to meet demand in Uchira for drinking water. Demand frequently exceeded supply in the dry season, and both the supply and pricing of the water were said to restrict its use for irrigation activities. There was no strategic oversight by the Pangani River Basin Office in relation to wider competition and contestation over water sources.

In Uchira, only those who can irrigate are guaranteed good agricultural production – producing tomatoes, onions, and other horticultural crops. Small-scale use of canal irrigation is no longer feasible, and a 1970s FAO dam scheme operated for only a short period and has lain idle ever since. Wealth-ranking exercises in Uchira in 2004 and 2016 show that the wealthiest families are those who have more land, and who have diversified production using irrigation. Increasingly, irrigated agriculture takes place in the flat areas in proximity to the Miwaleni Spring, enabled by loan financing and the availability of cheaper diesel/petrol pumps. During the visit in October/November 2016 a large pump was set up on the spring with pipes leading to nearby fields, in close proximity to a sign proclaiming that unauthorised pumping of water is forbidden. The ground water table is such that a shallow well of three to five metres also allows water to be pumped on to the fields, and many farmers are digging wells on land which they rent from local landowners.

Individual investors (from outside of Uchira) and self-organised groups of local men and women appear to be driving the use of irrigation, spurred on by national government rhetoric on investment in agriculture and the increasing affordability of small pumps. During planting, weeding, and harvest,

labour is required on the irrigated plots and provides employment in Miwaleni. Capital is required to invest in pipes, pumps, fuel, seeds, pesticides, fertiliser, and labour, and many of the investors and groups use loan capital to establish this production. De Bont et al. (2019), in their study of the Miwaleni Spring and the villages in the neighbouring Kahe ward, also confirm the increasing presence of irrigators using pumps and shallow wells. They chart the differentiation between types of farmers (those who produce crops only, those who mix food and cash crops, and those (few large-scale investors) who produce high-value cash crops only.

According to the farmers, in late November of 2016 direct pumping from Miwaleni Spring was shut down by 'government officials', and the pumps were confiscated because the farmers were drawing water without a permit. This story was featured on the main national government channel (ITV), with farmers complaining that they were now in a terrible position as their fields had already dried up and they were left with loan liabilities. The village government is supposedly also charged with implementing local by-laws preventing water extraction by small farmers, but members of the council had also invested in the irrigation, saying they did not know that a permit was required.

From long-term livelihoods data in Uchira, mechanised pumping can be viewed as a marker and driver of economic and social differentiation. As confirmed by de Bont (2018), types of irrigation practice in this locality characterise types of farmer, and much of this differentiation relates to what farmers grow and their access to markets. Producing commercially lucrative crops such as onions and tomatoes requires significant capital investment, and returns are not guaranteed. The entrepreneurial agricultural investor is an interesting case to consider here. This group did not exist in Uchira until recent years. The area is rapidly urbanising and is in close proximity to Moshi town. As also noted in Zambia (Sitko and Jayne, 2014), the non-resident agricultural investor is an increasing phenomenon. In the case of Uchira/Miwaleni, these investors are not necessarily purchasing land, but are renting it from longer-term residents. However, there is an active and inflating land market in the area, and this is causing tensions within families, as older residents sell off land to newcomers. The income from this land tends to be used to supplement daily expenditure rather than capital investment in other activities. This causes resentment from other family members who had expected to inherit the land and can instead be rendered landless.

De Bont (2018) suggests that these agricultural investors are not significant in number, and that through renting land and labour they have positively benefitted residents. She also suggests that the water table and hydrology of the area can potentially support greater exploitation of the ground water without significant impact. There are a couple of tensions being expressed locally, however, that she does acknowledge. The agricultural investor is seen not to be investing in the land or the local community for the long term. They are not "of the village". They are seen to mine the land for profit and to be likely to move on if conditions deteriorate. An excessive use of chemicals and increasing crop diseases are noted by resident farmers. These incoming farmers can afford to pay for water permits, but they are not organised into recognised collective arrangements, and the Pangani River Basin Office has no capacity to deal with them as individuals. In addition, the position of the agricultural investors allows them to exploit the local land owners and labourers in the rates they pay for land rental and labour. While rates may be better than in previous years, to what degree are they fair to those who are forced to labour (through their own lack of capital)? The potential for the better-off farmers, and in particular the larger agricultural investors, to exploit poorer farmers is significant. As one labourer framed it, "[Y]ou cannot farm here anymore without capital, so if you don’t have capital you are weak, and just have to accept what is available".

To what extent is this differentiation a problem? Of course, it may not be. It might be a sign that agriculture is transforming: the more productive farmers are able to invest more and as they do so they will drive economic transformation. On the other hand, this could lead to more exploitation through accumulation and dispossession of land and resources, and labour exploitation.

Again, these are political and normative questions, and are beyond the narrow concern of irrigation institutions. It is almost certain that existing institutions do not have the capacity to address the consequences of the wider dynamics of societal change. The problem identified here, however, is the challenge of recognising the differentiated nature of irrigators in order to regulate their activities fairly. It again shows the problematic nature of policy that assumes that there are only two categories of farmer: the traditional small-scale, and the large commercial. The isomorphic mimicry in the Tanzanian irrigation policy, which prescribes the creation of WUAs to legitimise and adjudicate water access, assumes a degree of homogeneity among farmers, and this creates a capability trap for governance organisations in responding to increasing differentiation between farmers or to patterns of actual existing irrigation practice.

CONCLUSION

Addressing the problems outlined above will not be an easy task in the context of institutions that already lack the capacity to implement existing legislation and control measures. Herein lies the key problem: those institutions are designed on the basis of normative ideas of how irrigation should be managed in theory, rather than dealing with existing practice and capability.

This article draws on a now-extensive body of literature critiquing attempts to apply idealised institutions and policies under the broad heading of 'good governance'. Water and irrigation policies framed by externally promoted IWRM principles encourage isomorphic mimicry and thus create capability traps whereby policies and institutions cannot function either as they are designed or respond to the realities of local practice. Isomorphic mimicry in policy and institutional design draws on externally derived ideas of best practice, such as the use of WUAs to manage and control access to water. As broader evidence on WUAs shows, they can take many forms and they are not automatically a straitjacket. However, in the cases presented in this paper we find that isomorphic mimicry in the policy adoption of WUAs combined with deeply ingrained normative assumptions on agricultural transformation, actively prevent policy and governance organisations from responding to actual conditions and challenges.

Increasing FLID poses new challenges for the governance of irrigation. We illustrated this through three case studies informed by interested actors at local and national levels. The cases show organisation capability challenges related to recognising and working with diverse forms of irrigator organisations, of adjudicating competing demands for water resources by different users, and of increasing farmer differentiation. It is both impractical and impossible to try to 'solve' or respond to all these problems at once, and solutions cannot be imposed externally through redesign of existing institutions. Such an approach would repeat the issue of isomorphic mimicry and would reinforce existing capability traps. Instead, the next step might be to work with the local and national water governance organisations – currently locked in capability traps – to recognise the rise of farmer-led irrigation and the differentiation that it entails. This step is more radical than it sounds, for it entails challenging existing assumptions and deeply ingrained patterns of isomorphic mimicry in policy and institutional design.

ACKNOWLEDGEMENTS

We would like to thank Chris Mdee, Erast Mdee, Yusuph Mfinanga and Canford Chiroro for their research assistance during the data collection process. Thanks also to the reviewers for their helpful suggestions and comments.

The Choma and Chitsukwa studies were part of a research project funded by the DFID-ESRC Growth Research Programme (DEGRP), grant no. ES/J009415/1: "Innovations to Promote Growth Among Small Scale Irrigators". The publication of this paper in an open-access journal has been supported by funding

from the DFID-ESRC Growth Research Programme through award ES/L01239/1: "Assessing the growth potential of farmer-led irrigation development in sub-Saharan Africa".

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